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Health Care Payment Incentives: A Comparative Analysis of Reforms in Taiwan, Korea and China

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Abstract. Payment incentives have significant consequences for the equity and efficiency of a health care system, and have recently come to the fore in health policy reforms. This paper first discusses the economic rationale for apparent international convergence toward payment systems with mixed demand and supply-side cost sharing. We then summarize the recent payment reforms undertaken in Taiwan, Korea and China. Available evidence clearly indicates that incentives matter, and that supply-side cost sharing in particular can improve efficiency without undermining equity. Further study and monitoring of quality and selection is warranted.

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1. Introduction

Payment incentives have significant consequences for the equity and efficiency of a health care system, and have recently come to the fore in health policy reforms. Focusing on established market economies, Cutler (2002) describes three "waves" of international health policy reform: 1) establishment of universal coverage and equal access, with low patient cost sharing; 2) attention to cost controls, rationing and expenditure caps; and 3) consideration of incentives and competition.

In developing and newly industrialized economies, although the institutional context differs, a similar pattern applies. The "first wave" of universal coverage is relatively more recent, and in some cases ongoing. South Korea established National Health Insurance (NHI) in 1989, Taiwan in 1995. In China, only about 10% of rural residents and 50% of urban residents have health insurance. Resource-constrained and with differing traditions of social solidarity,[1] many emerging market economies have been unable or unwilling to cover the same generous package that most established market economies offered in the 1960s and 1970s. Health spending remains a modest percentage of GDP (see Figure 1). Nevertheless, that percentage has grown significantly. For example, health spending grew from less than 3% of South Korean GDP in 1980 to about 6% currently. Financing pressures mount. In Korea and Taiwan, NHI expenditures have exceeded revenues for several years; urban health insurance programs in China have experienced double-digit spending growth.

This paper compares payment reforms undertaken in Taiwan—Republic of China, South Korea, and the People's Republic of China (hereafter Taiwan, Korea, and China) and analyzes evidence regarding reforms' effectiveness. These reforms not only directly impact Chinese and Koreans—more than a fifth of mankind—but

[1] Yang (1997) asserts that "health care should be the right of all citizens, but this view has

also offer insights into how payment alternatives function in widely varying institutional contexts, which is of policy import for many other countries.

We compare patient and provider cost sharing incentives with other emerging and established market economies. Demand-side cost sharing was introduced first, and in some cases (e.g., Korea) is at excessively high levels, imposing financial risk on consumers and a heavy burden on the poor and unhealthy. By contrast, supply-side cost sharing is not yet widely used. Results from pilot programs are encouraging; provider incentives can foster cost-conscious medical practice without compromising quality or solidarity. Accordingly, we suggest that future health care reforms should focus on provider incentives.

The paper is organized as follows. First, we briefly discuss the economic rationale for apparent international convergence toward payment systems with mixed demand and supply-side cost sharing. We then summarize the recent payment reforms undertaken in Taiwan, Korea and China in turn.

2. Payment System Incentives

Payment systems around the world are diverse. Nevertheless, most countries now use, or are moving toward, systems that give both consumers and providers incentives to balance benefits and costs in their health-care decisions. In health economics parlance, "mixed payment systems" feature "cost sharing" on both the demand side (i.e., patients) and the supply side (i.e., providers). This conceptual overview examines the theoretical rationale for what we speculate will be increasingly international convergence toward such a mixed payment system.[2]

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never prevailed in Korean public policy" (p 62).

[2] We present this overview of incentive theory, especially supply-side cost sharing, partly because as Newhouse (2002, p 17) notes, "outside a coterie of health economists, supply-side cost sharing is less well understood" (compared to demand-side cost sharing).

2.1 Demand-Side Cost Sharing

Since for insured consumers the price at point of service is low or zero—usually well below marginal cost—the consumer has an incentive to over-use services (often called *moral hazard*). One way to curb consumer appetites for "too many" services is to require co-payments or co-insurance. Relying on such *demand-side cost sharing*[3] to control costs has several disadvantages, however (see Table 1): it imposes financial risk on consumers (Zeckhauser 1970), and can compromise equity by creating a barrier to access.[4] Patient cost sharing corresponds to a tax on the sick and is disproportionately burdensome for the poor.

Moreover, demand-side cost sharing does not necessarily reduce the rate of health expenditure growth under a fee-for-service system, since providers can request more services or charge higher fees. Insurance such as NHI tends to reduce (and sometimes eliminate) incentives for patients and physicians to control cost. For example, in Taiwan, among those previously uninsured, per capita outpatient visits increased by 129 percent, and even among the previously insured group, per capita outpatient visits increased by 23 percent after the implementation of NHI (Cheng and Chiang 1997). These increases probably reflect not only an increase in patient-initiated visits, but also a form of supply-side moral hazard: physicians generate more visits, provide more services and charge higher fees, knowing patients do not pay the full cost of care. This issue of "supplier-induced demand" highlights the importance

[3] There are several other terms used for various kinds of demand-side cost sharing: user fees, tariffs, copayments, deductibles, *ticket moderateur* (France), and cost recovery. Informal demand-side cost sharing is sometimes called paying a gratuity, and is very common in many transitional economies (Kornai and Eggleston 2001), including China (*hong bao*).

[4] This inequity can also be viewed as an inefficiency of missing insurance markets, since high patient cost-sharing prevents consumers from insuring against the financial risk associated with becoming severely and/or chronically ill (see e.g. Newhouse 2002, p 17).

of considering incentives on both the demand- and supply-side when designing payment systems.

2.2 Supply-Side Cost Sharing

Just as empirical evidence (e.g., the RAND Health Insurance Experiment; Newhouse and co-authors 1993) has shown that health care consumers' utilization decisions are sensitive to price, considerable evidence also suggests that provider reimbursement affects quantity and quality of health care services.[5]

The supply-side analog to patient co-insurance is the share of cost borne by the provider. For example, capitation—a fixed payment per enrolled consumer per period—rewards providers for strictly limiting services provided. Lower values of supply-side cost sharing lead to "mixed systems." In the extreme, pure cost-based reimbursement gives providers little economic incentive to control costs.

In reality, the payer does not know the exact costs of care and reimbursement is based on a price schedule. One very common contract is fee-for-service (FFS) payment. Since fees typically include a margin of profit, FFS financially rewards those who provide large quantities of services.[6]

Response to financial incentives may be tempered by professional ethics. Physicians and other medical professionals act as *agents* for patient *principals* in the sense that they are called upon to take a patient's best interest into account when using their specialized knowledge for diagnosis and treatment. In this role, however, physicians are called upon to serve the interests of *two* "masters"—the patient on the one hand and the physician's employer, payer, or own pocketbook on the other. The

[5] See discussion for example in various chapters of the *Handbook of Health Economics* (e.g., Cutler and Zeckhauser 2000).
[6] Another prominent form of provider payment is salary, which bears some similarities to cost reimbursement (since the provider is not at risk for costs) but also gives incentive to limit

weight that a provider gives to being a good agent on behalf of a patient (sometimes referred to as "agency"; see McGuire 2000) shapes how a provider reacts to financial incentives. A reasonably good agent, for example, will be less inclined to "induce" patient demand in order to reap high FFS reimbursement or to deny potentially beneficial services in order to retain more capitation payment.

At least four advantages of supply-side cost sharing support its widespread and increasing use. First, supply-side cost sharing does not impose financial risk on patients. Second, it does not discourage medical utilization among low-income patients. Third, as Newhouse (1992) indicates, the phenomenal growth of new medical technology fuels medical care spending growth. Since providers heavily influence use of new technology, supply-side cost sharing could provide more effective incentives than demand-side cost sharing for affecting the pace of new technology adoption. Finally, intermediate forms of supply-side cost sharing seem "fair" for providers, especially those with small panels of patients or risk pools, because insurers share the financial risk of costs exceeding the prospective payment (Pope 1990).

2.3 Toward an Optimal Payment System

Much theoretical work (e.g., Ellis and McGuire 1990; Ma 1994; Newhouse 1996) suggests that the optimal provider payment system mixes pre-payment with some cost reimbursement. Indeed, an optimal payment system almost surely involves mixed levels of *both* supply-side and demand-side cost sharing (Eggleston 2000).[7] This result is intuitive: consumers probably prefer to pay some out-of-pocket

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services provided (to increase the provider's own on-the-job 'leisure').

[7] In the simple model developed in Eggleston (2000) and discussed in Newhouse (2002, chapter 5), this common mixed payment system emerges as optimal to balance incentives for cost control with mitigating risk selection.

deductibles and co-payments rather than to have their health care providers receive large financial rewards for skimping on care or discriminating against expensive-to-treat patients.

A general policy conclusion follows immediately: significant benefits flow from having both consumers *and medical professionals* internalize at least part of the social trade-off between quality care and scarce resources. The respective mechanisms are demand- and supply-side cost sharing.

Some researchers consider global budgeting a transitional payment form between FFS and capitation or case payment (e.g., Barnum et al 1995). Others consider global budgets ideal to control costs. Further empirical evidence from diverse institutional settings would help to clarify this debate.

Several forms of provider payment require more complex administrative and service delivery infrastructure than currently available. Clearly the "optimal" payment arrangement depends on the institutional context. What works best in Taipei or Seoul will surely be inappropriate for rural villages in China.

2.4 International Experience: Convergence to a Mixed Payment System

Empirical evidence from countries around the world confirms the correlation between disaggregated (FFS) payment and higher cost, at both the broadest (national) and narrower (organization and individual physician) levels (e.g., Gerdtham and Jönsson 2000; Hickson, Altmeier and Perrin 1987; Krasnick et al 1990). In the US, after the prospective payment system (PPS) was introduced for hospitals, admissions generally declined, average lengths of stay fell, and some patients got dumped to non-PPS facilities, consistent with the incentives of case-based payment (see Table 7 in Cutler and Zeckhauser 2000). Just the first two years of implementation saw a 25% fall in patient days, with little evidence of any decline in quality or health outcomes,

which "shows that how providers are paid can have large consequences for costs and efficiency" (Newhouse 2002, p 28). The rise of managed care organizations in the US, with their predisposition toward supply-side controls and aggregated capitation payment, further illustrates the power of payment incentives. "The consensus estimate would be that patients under managed care spend about 10 percent less than patients in indemnity plans, adjusted for differences in the underlying health of the two groups" (Cutler and Zeckhauser 2000, p 604).

In light of this evidence, many countries have adopted mixed payment systems. Consumer out-of-pocket spending usually accounts for a small but nontrivial percentage of a nation's total health expenditures, while supply-side cost sharing through capitation and case-based payment gains ground in most industrialized countries (see Table 2). Emerging market economies are also widely adopting this mixed incentive system.

Although critics often highlight the limitations of simple case payment arrangements, simplicity can be a virtue. The administrative costs of complex payment mechanisms can outweigh their nuanced incentive benefits, especially when only basic informational and managerial infrastructure supports implementation. It is often forgotten that even in US, including capital costs in DRGs took a decade.[8]

Reforms in Taiwan, Korea and China seem to be moving toward mixed payment systems. In particular, both Korea and Taiwan are experimenting with supply-side cost sharing in the form of case-based payment (focusing on a few categories of service chosen to minimize administrative, clinical and incentive complexities) and global budgets (borrowing from German and Canadian experience). In the next sections, we discuss payment reforms in Taiwan, Korea and China, in turn.

[8] For a recent, detailed discussion of DRG payment as one form of administered pricing, see

3. Policy Reforms in Three East Asian Countries

3.1 Taiwan

In March 1995, Taiwan implemented national health insurance (NHI) by integrating three separate health insurance programs and covering the remaining uninsured population. By March 1997, the NHI program earned a 75 percent public satisfaction rate, and has consistently ranked among the most popular public programs (Lu and Hsiao 2003).

Taiwan's NHI aims to provide equal access to health care, ensure quality and efficiency, and control health care expenditures within an affordable range. To achieve these objectives, the NHI program features compulsory universal coverage under a single payer, financed by payroll taxes with government subsidies from general revenue.

Demand-side Cost Sharing

NHI imposes modest copayments (lowest for a private clinic visit, higher for academic medical centers). Low-income families and families residing in mountainous areas or on offshore islands are exempt from cost sharing, as are patients who suffer from certain catastrophic or chronic disorders (Lu 1999). Caps on patient cost sharing (6% of average national income per admission, and 10% per year) also help to ensure equitable access. Lu and Hsiao (2003) calculate that patient out-of-pocket spending declined from 48% to 30% of total health spending between 1993 and 2000, concluding that NHI gives Taiwanese fairly comprehensive financial risk protection.

Newhouse 2002.

Patients in Taiwan are free to choose their own physicians, and physicians who practice in clinics are completely independent of hospitals. Patients often self-refer, going directly to tertiary hospitals for care. This lack of a referral system, in combination with the low cost sharing, contributes to cost escalation as patients "doctor shop."

To help cope with NHI budget pressures, patient cost sharing increased in 2001 and again in 2002 for certain kinds of visits, drugs, inpatient care, lab tests and examinations (Cheng 2003). Nevertheless, Taiwan's reliance on demand-side cost sharing remains moderate by international standards, and stop-loss features and exemptions assure far more financial protection for Taiwan's patients than for many in Korea or China.

Provider Incentives

The major payment method under the NHI program is fee-for-service (FFS). Hospital staff physicians, traditionally on salary, increasingly receive bonuses tied to "revenue productivity" through a system of "professional fees" (Cheng 2003).

Taiwan's NHI designers, aware of the cost-escalating incentives of FFS payment, proposed a global budget system with supplemental DRG payment for inpatient services. Recent reforms move toward that goal of supplanting FFS with supply-side cost sharing.

A pilot experiment with case payment initially included 28 frequent procedures, such as appendectomy and hemerrhoidectomy. Yang and Lin (2002) study inpatient LOS and hospital ownership under case payment, using 2000 data from 17,026 patients. Controlling for hospital level and teaching status as well as patient age, sex, and discharge status, they find that patients admitted to government-

owned hospitals had longer LOS than patients with similar diagnoses admitted to private hospitals. Further analysis will help to clarify to what extent this result may stem from differences in case mix, and whether response to case payment differs by ownership type when looking at provider behavior before and after the payment change, controlling for other policy and economic changes.

Tsai and co-authors (2002) examine provider response to case payment by analyzing a sample of 49,265 patients who received inpatient care for hemorrhoids. The study period covered one year before to almost two years after case payment began. Provider response was consistent with theory, apparently increasing the number of low-cost cases and pushing high-cost cases over the threshold for FFS reimbursement for outlier cases. Overall, spending per case decreased, but the number of cases grew faster, resulting in an aggregate increase in spending for this procedure.

Lang, Chi and Liu (2003) reinforce this finding. They studied the impact of case payment for laparoscopic cholecystectomy. Using open cholecystectomy patients as an imperfect comparison group, they find that case payment was associated with lower average cost and LOS, but higher volume, resulting in higher total costs for the procedure. The authors found mixed effects on outcomes, as measured by surgical mortality, emergency admissions and readmissions.

Taiwan continues to experiment with payment system reforms, including implementation since 1997 of a global budget system with separate global budgets for clinic outpatient services, dental services, traditional Chinese medicine, and finally (in mid-2002) for inpatient services. Another significant initiative bases payment for five major conditions on clinical process and outcomes (a "fee-for-outcomes" approach; Cheng 2003). Further research examining the impact of these payment reforms should be a top priority.

3.2 South Korea

South Korea implemented National Health Insurance in 1989 by expanding compulsory insurance from formal-sector employees to the self-employed and farmers (Yang 1997). Similar to the Chinese goal of *di shuiping, guang fugai* ("low benefit level, wide coverage"), Korea has achieved virtually universal NHI coverage but at a relatively modest benefit level. Insurance premium contributions are about 4% of income (Kwon 2002, p 5).

Demand-side cost sharing

Korean demand-side cost sharing includes deductibles and co-insurance that varies by service: 20% for inpatient care, 30% for outpatient services at clinics, and about 50% for hospital outpatient services (Yang 1997). This pattern is consistent with constraining moral hazard, since it features higher cost sharing for "more optional" (i.e., more price-elastic) services. However, these rates are high by international standards, and several factors compound the patient burden of cost sharing. Many services, including some common and expensive high-technology services, fall outside the NHI benefit package. Patients also face special treatment charges, a limitation on coverage to a certain number of days per year (including "prescription days" as well as inpatient days), and lack of stop-loss coverage (Yang 1997, p 64-5). In total, patient cost sharing accounts for about 50% of total health spending in Korea—39.3% of inpatient spending (15.7% for copayments and 23.6% for full payment for uninsured services) and 61.1% of outpatient spending (36.9% for copayments and 24.2% for uninsured services) (Kwon 2002, p 85). Out-of-pocket

payments represent over half of total health expenditure, the highest percentage in the OECD (Table 3).

Provider Incentives

Traditionally, Korean provider payment has been on a FFS basis. As in Taiwan, physicians in hospitals are often salaried with bonuses linked to performance. Patients have had open choice of provider, frequently self-referring to tertiary care. Attempts to implement "gatekeeping" proved ineffective, partly because hospitals feared losing market share if they enforced such requirements.

Although at first Korea's NHI ran substantial surpluses (in 1994 totaling about two years' premiums; Yang 1997, p 65), health expenditures have exceeded premium revenues since 1997. Kwon (2002) suggests the main contributory factors have been population aging and lack of provider incentives. The latter points to the importance of supply-side incentives for sustaining NHI in Korea, just as in Taiwan. Given the already high level of demand-side cost sharing and its adverse implications for social solidarity, Kwon argues that "national health insurance in Korea needs to redirect its policy priority from the demand-side cost sharing to payment system reform for health care providers" (p 91). Several analysts of the Korean NHI experience concur (Barnum et al 1995; OECD 2002).

In Korea and many other Asian economies, the traditional system of providers profiting from selling drugs gives incentive to over-prescribe medications. Taiwan has reduced the high profit margins for drug dispensing by reducing reimbursements and using reference pricing (Lu and Hsiao 2003, p 84). China has recently initiated a policy to separate prescription and dispensing functions. Korea legislated such a separation in July 2000. Unsurprisingly, the measure proved extremely controversial:

"despite a lengthy planning process and negotiations, in an attempt to derail the reform process, the physician group called for an unprecedented four general strikes, forcing closure of most clinics and hospital outpatient departments" (Yang and Bae 2001). The government raised physician fees 45% after the physician strikes, and agreed to defer implementation of some other reforms, including those of provider payment (Kwon 2002).

Experimentation with case payment began in the mid-1990s (Yang 1997). Kwon (2002) describes the results of these payment reforms in some detail. Several points are of note. As in Taiwan, case payments began with pilot reforms on just a few conditions and have subsequently expanded to more conditions and more voluntarily participating institutions. Generous margins (on average 23.8%) above the FFS reimbursements for the nine selected services (which together account for 25% of inpatient cases) helped to overcome provider reluctance to accept the perceived infringement of professional autonomy. (Starr [1982] discusses the history of similar objections to prepayment among American physicians). Also like in Taiwan and several other emerging markets adopting case payment (see Table 4), selection of procedures or conditions sought to minimize the scope for undesired provider behavioral responses, such as up-coding ("DRG creep") and stinting on services for complex conditions with wide intra-case variation in resource use. Since the Korean DRG system, K-DRG, incorporates outlier payment features, like the US PPS, its incentives are not extremely high-powered. With some reimbursement depending on actual resource use, K-DRGs are actually a form of mixed payment. K-DRGs also represent an expansion of NHI coverage, since they bundle payment for some services not included under FFS reimbursements.

Provider response to K-DRG payment has been consistent with theoretical predictions. As shown in Table 5, spending per case and LOS both declined, to differing extents across case categories. Controlling for institutional type (clinic, hospital, or general hospital), DRG-based payment reduced medical expense by 14.0% and the LOS by 5.7% (Kwon 2002). Providers substituted outpatient for inpatient care. The average number of inpatient diagnostic tests fell from 5.06 to 3.85; the average number of tests before hospitalization increased from 3.51 to 4.46 (with post-discharge tests apparently unaffected); and outpatient visits increased both before and after hospitalization (ibid). Quality as measured by rates of complication and re-operation did not appear adversely affected, although Kwon warns that any expansion of case payment to more complicated conditions should be accompanied by heightened quality monitoring (ibid). Reforms in 2001 introduced fee negotiation between insurer and providers with an aim of capping overall expenditure and delegating micro-allocation decisions to the physician association, as in Canada and Germany (ibid).

Further evaluation of the Korean payment reforms would be valuable. A "natural experiment" in which some providers accept prospective payment while others remain under FFS reimbursement allows researchers to identify a "control group" and contrast the "treatment" (new supply-side cost sharing rules) with the "control" group. Such a "difference in difference" study design would help to isolate the effect of prepayment from confounding trends. Some analysis of Chinese payment reforms has applied this approach (Yip and Eggleston 2001). For example, to what extent do the increases in numbers of cases (see Table 5) differ from caseload trends for these conditions in institutions remaining under FFS? Careful consideration and statistical controls should be made for self-selection into the treatment group, however.

Where possible, data should be collected to evaluate whether supply-side cost sharing induced cost shifting, selection, or strategic quality distortions.

Both Yang (1997) and Kwon (2002) emphasize the importance of expanding the NHI benefit package. Even if payment reforms achieve the desired behavioral changes, they are less likely to have an overall impact—and cost-shifting is more of a problem—when their scope of coverage is limited to a small fraction of total health spending.

3.3 China

China's enviable achievement in improving health from the 1950s through the 1970s is well known (Sidel 1972; Jamison 1984; Hsiao 1984; World Bank 1997). Beginning in 1978, China embarked upon wide-ranging economic reforms resembling those of other countries transitioning from central planning to market-based economies. These policies have been successful in promoting rapid economic growth, although many challenges of transition remain.

China's health sector has been far from immune to the transformation. The most dramatic changes have been in rural areas. The Cooperative Medical System (CMS) used commune welfare funds to pay village doctors and health stations. Following agricultural decollectivization in the early 1980s, the CMS system collapsed along with the communes. In 1979 about 90% of the villages across China were covered by CMS; by 1989 only 4.8% were (Zhang 1994). Most village doctors became private practitioners relying on FFS payment. Insurance cover fell precipitously, from about 70% of the population in 1981 to only 20% by 1993 (World Bank 1997). China has encouraged re-establishment of CMS in rural areas (Yuan and Chen 1994), but implementation has been slow, largely because of lack of financing.

China has also introduced significant urban health sector reforms. Traditionally, China's health protection system for urban residents consisted of an extensive subsidized public delivery system—implicit coverage—and two explicit health insurance programs, the Government Insurance Scheme (GIS) and Labor Insurance Scheme (LIS). To expand coverage, move away from SOE-based self-insurance (which is what LIS amounted to), pool risk at least at the municipal level, and revise incentives to encourage greater efficiency, experiments with various payment and financing reforms began in the 1990s. The stated goal is *di shuiping, guang fugai* ("low benefit level, wide coverage"). The expansion of insurance has progressed rather slowly, with only half of urban residents currently covered. Zhang (2002) reports province- and municipal-level coverage rates in 2001 ranging from 13.9% in Chongqing to 60% or more in Fujian, Hunan, Qinghai and Tianjin.

China's rapid economic growth contrasts sharply with the transformational recessions of most transitional economies. Nevertheless, Chinese economic reforms have been associated with contracting central government revenues and, in the health sector, rapid cost escalation. Government spending on health declined from 22.8% to 15.3% of total health spending between 1991 and 1999 (Ministry of Health 2001), while total health expenditures grew at an average real rate of growth of 13.4% from 1986-93, almost 4% faster than GDP growth (World Bank 1997).

Demand-side cost sharing

Not coincidentally, China's rapid cost escalation has taken place under a payment system structure dominated by "free care" for the urban insured and FFS payment. Insured patients now pay co-payments that vary by region, usually in the 10-30% range. Despite this modest cost sharing, low coverage—especially for the

rural population—makes high levels of out-of-pocket spending an equity concern. Zhao and co-authors (2002) estimate that individual patient spending constituted 60.6% of total Chinese health spending in 2000. This percentage has increased from 37% a decade earlier. Thus, high levels of patient out-of-pocket payment in China, as in Korea, suggest that further cost control cannot rely on demand-side cost sharing.

Provider Incentives

On the supply side, financing reforms drastically reduced government subsidies to hospitals and other facilities. To cover the revenue losses on below-cost prices for basic services, profit margins were generous for new high technology procedures and many pharmaceuticals. As Yip and Eggleston (2004) note, this pricing scheme is potentially a second-best government intervention, trading off pricing efficiency for equitable access. Unfortunately, the distorted incentives implicit in this price system can lead to large adverse side effects, as providers seek to expand utilization of—and therefore net revenue from—high technology procedures and pharmaceuticals.

Pilot programs began in 1994 in the two middle-sized cities of Zhenjiang and Jiujiang, with similar local-initiated reforms in Hainan and a few other locations. Designed to control cost and pool risk, the reforms draw upon the Singaporean example of Medical Savings Accounts. These individual accounts are combined with a social insurance fund for catastrophic expenses, usually at the municipal level. Municipal, district, or other regional purchasers often implement demand-side and supply-side incentive reforms simultaneously with, or soon after, financing reforms. For example, Zhenjiang and Jiujiang introduced a fixed payment system for inpatient and outpatient episodes of care simultaneously with city-wide risk pooling. Zhenjiang and Jiujiang had

some success in controlling health cost inflation and improving efficiency, although policymakers now question the effectiveness of the "Liang Jiang" model for long-term cost containment. Anecdotal evidence also suggests exacerbated risk selection, cost shifting, and reductions in quality of care and equity of access (Yip and Hsiao 1997).

Authorities in Shanghai decided to implement global budgets for hospitals in 1994 together with other insurance reforms (Guo and Ge 1998). These policies have reportedly reduced health care expenditure growth in Shanghai from 34% prior to 1993 to the 12-13% growth range currently, without evidence of reduced access or quality of care (Yip and Eggleston 2001, 2002).

Expansion of urban health insurance reforms leaves decisions about payment design to the discretion of local authorities, consistent with widely varying socioeconomic and institutional contexts. This regional diversity offers a wealth of "natural experiments" regarding the impact of changing payment incentives. Unfortunately this variation comes compounded with many other socioeconomic changes and a dearth of relevant baseline and follow-up data. Many studies report pre- and post-reform average expenditures or expenditure growth rates. Although suggestive, such a study design does not allow researchers to disentangle various factors that contribute to expenditure changes. Moreover, evidence concerning other outcomes of interest, such as the impact on cost shifting, quality of care, and risk selection, are usually only anecdotal. Multivariate regression analysis of provider- and/or patient-level data to control for confounding factors is rare.

For example, Yang and co-authors (1999) analyze the results of capitating hospitals for GIS program beneficiaries' outpatient expenditures in Putuo district of Shanghai. Per capita outpatient expenditure was 12.3% higher in the year of implementation than the previous year, compared to an average annual rate of increase in

the previous three years of 23.4% under FFS reimbursement. Certainly this reduction is consistent with the incentives of supply-side cost sharing. But the wide variation in growth rates under FFS casts some doubt on this result; the 12.3% growth rate under capitation appears quite similar to the 13% growth rate two years prior to capitation's implementation, despite much higher growth rates in other pre-capitation years (which average to 23.4%). The authors suggest that capitated rates should be adjusted for the age structure of the patient population, given the strong incentives to stint on care for, or altogether avoid, chronically ill elderly patients under the 1998 flat-rate capitation program. Unfortunately no evidence is available on the extent of stinting or selection under the 1998 reforms. A longer follow-up period, comparing a range of outcomes with a plausible control group (such as a neighboring district in Shanghai that did not revise payment) could furnish much greater insight into the impact of such payment reforms.

Hainan Province offers an interesting case study. To control costs and reduce the administrative burden and political friction of retrospective claims auditing, Hainan implemented prospective payment of six key hospitals in January 1997. Yip and Eggleston (2001) use claims data for hospital expenditures and a difference-in-difference analysis to isolate the impact of the payment system reform compared to hospitals that were paid on a FFS basis throughout the study period (June 1995-June 1997). Hospital prepayment is associated with a slower rate of growth of overall expenditures, program spending, and patient co-payments per inpatient admission, compared to FFS (see Table 6). Reduced expenditures per admission in the prepaid hospitals (by 26-35%, and over 50% compared to trends in FFS hospitals) indicate the power of supply-side cost sharing for controlling costs. Nevertheless, the authors note that caution is warranted, since the expenditure decrease could stem from some

combination of reduced quality of care, risk selection, and cost shifting to the uninsured.

In a companion paper, Yip and Eggleston (2004) report that Hainan's prepayment reform was also associated specifically with a slower increase in spending on high profit-margin services—expensive drugs and high technology services—compared to FFS. The association of supply-side cost sharing with reduced growth in spending on the most expensive drugs seems particularly encouraging, given that pharmaceuticals account for a remarkably high share of hospitals' revenue (50 to 70 percent) and a large portion of aggregate health spending in China (52 percent in 1998). The authors conclude that provider payment reform can be an effective policy instrument for correcting market failures and adverse side effects of government health sector interventions (such as distorted prices to assure access to basic services).

Further research on the many ongoing payment reforms in China can help to clarify the benefits and costs of various payment systems under alternative institutional contexts. Few studies focus on administrative costs, but these can be crucial to understanding the incremental benefit of introducing more complicated payment mechanisms. Also unclear is whether the response to provider payment incentives differs systematically by provider type. For example, some theories of ownership predict that response to supply-side cost sharing is likely to differ between providers that are government-owned, private nonprofits or private for-profit organizations. This may be an important issue in the Taiwanese and Korean contexts, where the delivery system features a mix of ownership forms, and an emerging issue

for China, where recent reforms have spawned considerable property rights diversification, and further ownership and pricing reforms are underway.[9]

4. Conclusion

Experience in established market economies suggests that supply-side incentives are critical for sustaining affordable solidarity. Policymakers in Taiwan, Korea and China have experimented with similar payment reforms. In most cases, the incentives associated with different payment systems are well understood. Far less carefully studied, however, is the actual behavioral response of consumers and providers to payment incentives, controlling for confounding factors such as coincident reforms in other parts of the health care system that also impact health care demand and supply.[10]

Often fiscal pressure drives payment reforms. Nevertheless, the percentage of national income devoted to health care in Taiwan, Korea and China is generally close to that of other nations with similar per capita income, and still relatively low compared to that of many established market countries (see Figure 1). Moreover, even in the latter some evidence points to net benefits from technological change outweighing high and rising costs (Newhouse 1992; Cutler 2002; Newhouse 2002). Arguably more urgent than cost control is the need for better targeting and quality promotion. For both, provider incentives should be a priority focus.

Similar to recommendations by Kornai and Eggleston (2001a,b) for eastern Europe, we urge policymakers to continue experimenting with supply-side cost sharing, including capitation for primary care and case-based payment for hospitals.

[9] See discussion in Eggleston and Yip (2003).
[10] A growing literature documents the magnitude and impact of demand-side elasticities in developing countries (see discussion in Gertler and Hammer 1997). Yet surprisingly little

These forms of payment encourage cost control and leave the micro-allocation decisions in the hands of those most competent to judge effective use of medical resources, the health care professionals delivering care. However, the incentives of prospective, fixed payments can be overly strong, financially rewarding discrimination against expensive-to-treat patients. We therefore recommend mixed payment, that is, both an *ex ante* (risk-adjusted) fixed payment and some *ex post* payment based on patients' actual use of health services.

Implementation and careful evaluation of payment reforms in East Asia and other emerging market economies can contribute to more efficient and equitable evidence-based policy and to global understanding of supply-side incentives. The experience of industrial firm privatization and restructuring in transition economies has thrown considerable light on the perennial question of ownership and performance (e.g. Djankov and Murrell 2002). Similarly, incentive system reform across many different health sector institutional contexts can teach us about human behavior and help to confront some of the enduring conundrums of health policy.

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systematic analysis elucidates provider response to supply-side cost sharing.

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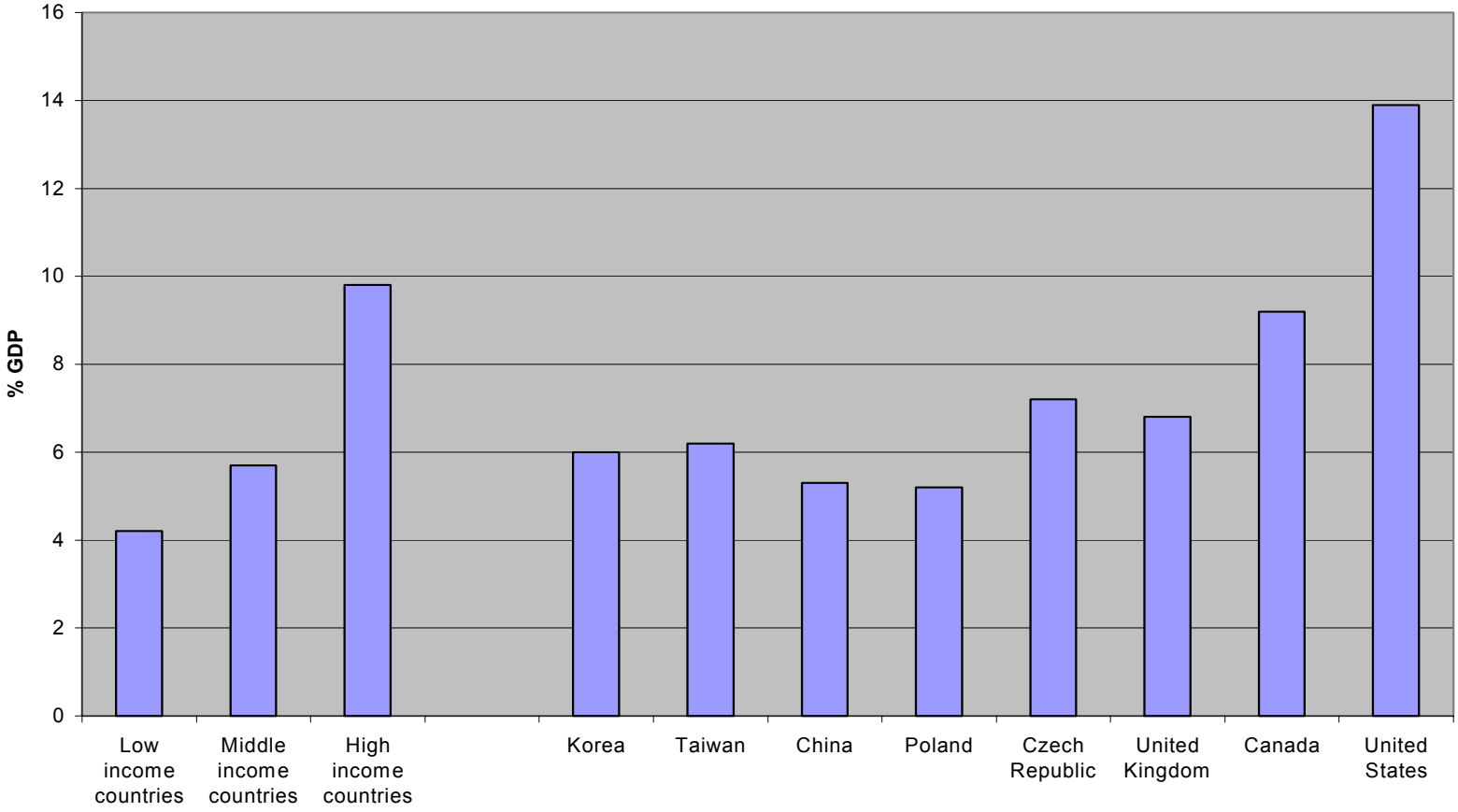
Figure 1. Health Spending as % GDP, late 1990s



Sources: World Development Indicators, World Bank 2000; Lu and Hsieh (2002) for Taiwan; Zhao et al. (2002) for China.

Table 1. The Incentive Effects of Payment System Policy Instruments

Policy Instrument	**Benefit** from a higher value of the policy instrument	**Cost** of a higher value of the policy instrument
Demand-Side Cost Sharing (Co-insurance rate)	• constrain over-utilization (curb moral hazard)	• inefficient risk bearing • inequity (tax on sick; regressive)
Supply-Side Cost Sharing	• constrain over-utilization • encourage cost reduction (production efficiency)	• underprovision • risk selection (inequitable insurance coverage)
Agency of Behalf of Patient Benefits (Professional Ethics)	• curb supplier-induced demand • moderate underutilization • reduce risk selection • promote equitable access and treatment	• indulge moral hazard

Source: Eggleston 2000.

Table 2. Provider payment systems in selected countries in the late 1990s

Country	Primary care	Outpatient specialists	Inpatient care
Australia	FFS	FFS	Budgets with indexed cost caps, some states adopting case-based payment
Canada	FFS, with global budget to physicians' association, negotiated by province		Budgets and salary
China	FFS	FFS	FFS, line-item budgeting and global budgets
Denmark	28% capitation; 63% FFS; 9% allowances	Capitation and FFS	Global budgets
Germany	FFS, with global budget to physicians' association, point system of assigned points per service, with the value per point lowered if budget exceeded		Target budgets and case-based payment
Japan	FFS	FFS	FFS (demonstration project of case-based payment)
Korea	FFS	FFS	FFS (pilot projects of case-based payment)
Netherlands	FFS if higher income; capitation (age-adjusted) if lower income; ex ante high risk pooling	FFS and salary	Global budgets, regionally negotiated
New Zealand	FFS, capitation, budget-holding	Contracts and FFS	Contracts and FFS
Norway	Capitation, salary and FFS	FFS and salary	Global budgets
Spain	Salary and capitation (age-adjusted)	Salary	Global budget for social security hospitals; per diem for other hospitals
Sweden	Salary for public; mixed payment in some counties	Salary + budget	Budgets
Taiwan	FFS	FFS	FFS (pilot projects of case-based payment)
United Kingdom after 1989 reforms	Capitation (age-adjusted) and FFS; GP fundholders after 1989 reforms; GP-led Primary Care Groups as purchasers/fundholders after 1999 reforms	Contracts and FFS	Contracts and FFS
United States	FFS (resource-based relative value scale), capitation with risk sharing arrangements, etc.	Primarily FFS	Primarily case-based (DRGs)

Sources: Kornai and Eggleston 2001 and the studies of Taiwan, Korea and China cited in the text.

Table 3. Out-of-pocket payments in selected OECD countries, 1997

Country	Out-of-pocket payments as a percentage of total health expenditure
Austria	25.1[1]
Canada	16.5
Czech Republic	8.3
Denmark	12.6[1]
Finland	19.9
France	12.6[1]
Germany	10.8[2]
Hungary	15.1[1]
Iceland	16.2
Ireland	12.9[2]
Korea	52.0[2]
Luxembourg	7.0
New Zealand	23.5[1]
Portugal	44.6[2]
Switzerland	29.8[2]
Turkey	31.7[1]
United Kingdom	2.7[2]
United States	17.2

[1] 1996; [2] 1995.

Source: Kornai and Eggleston 2001.

Table 4. Features of systems of payment per case for hospital services across selected countries in eastern Europe

Country	Payment categories	Payment rate basis	Facility adjustments feature	Outlier payment feature	Overall spending cap
Georgia	30	Historical budget and throughput norms			
Hungary	758	Historical costs	X	X	X
Kazakhstan	55	Historical budgets	X		
Kvrgyzstan	154	Historical budgets	X	X	
Lithuania	50	Historical bed-days		X	
Poland	9-29	Estimated payroll tax revenues			
Russian Federation	Up to 10,000	Varies	X		

Source: Langenbrunner and Wiley 2002, p 162.

Table 5. Impact of DRG-based Payment on Medical Expense and Length of Stay in Voluntarily Participating Korean Health Care Providers

(Unit: won, day, %)

DRG Code	No. of Institutions	No. of Cases	Medical Expenses per Patient	Length Of Stay
03900 Lens Procedures (monocular)	14	Before (1,589)	929,438	2.36
		After (5,549)	705,703	2.23
		Difference (%)	-223,735 (-24.1)	-0.13 (-5.6)
04100 Lens Procedures (binocular)	4	Before (69)	1,555,621	2.99
		After (55)	1,288,732	3.78
		Difference (%)	-266,889 (-17.2)	0.80 (26.7)
05900 Tonsillectomy &(or) Adenoidectomy (Age >17)	4	Before (45)	583,095	3.60
		After (102)	516,346	3.47
		Difference (%)	-66,713 (-11.4)	-0.13 (-3.6)
05910 Tonsillectomy &(or) Adenoidectomy (Age 0-17)	5	Before (182)	547,764	3.63
		After (199)	512,348	3.44
		Difference (%)	-35,416 (-6.5)	-0.19 (-5.1)
15700 Anal &(or) Stomal Procedures	23	Before (787)	458,214	4.50
		After (1,689)	454,193	4.48
		Difference (%)	-4,021 (-0.9)	-0.02 (-0.4)
16100 Inguinal &(or) Femoral Hernia Procedures (Age>17)	15	Before (63)	766,764	6.98
		After (211)	689,398	5.82
		Difference (%)	-77,365 (-10.1)	-1.16 (-16.7)
16110 Inguinal &(or) Femoral Hernia Procedures (Age 0-17)	9	Before (146)	585,891	3.46
		After (452)	499,088	3.50
		Difference (%)	-86,803 (-14.8)	0.05 (1.3)
16400 Complicated Appendectomy	8	Before (117)	1,126,888	8.55
		After (171)	1,166,047	8.99
		Difference (%)	39,158 (3.5)	0.45 (5.2)
16600 Uncomplicated Appendectomy	14	Before (385)	982,592	7.24
		After (1,285)	770,159	5.98
		Difference (%)	-212,432 (-21.6)	-1.26 (-17.4)
35800 Uterine &(or) Adenexa Procedures	16	Before (783)	987,831	7.61
		After (1,696)	934,732	7.01
		Difference (%)	-53,099 (-5.4)	-0.60 (-7.9)
37000 Cesarean Section	18	Before (1,763)	907,984	7.77
		After (2,902)	822,702	7.11
		Difference (%)	-85,282 (-9.4)	-0.66 (-8.5)
37200 Vaginal Delivery	7	Before (158)	420,562	3.65
		After (117)	429,338	3.50

With Complication		Difference (%)	8,776 (2.1)	-0.15 (-4.1)
37300 Vaginal Delivery Without Complication	21	Before (2,849)	347,622	3.24
		After (6,728)	375,784	3.15
		Difference (%)	28,161 (8.1)	-0.10 (-3.0)
Average Change (%)			-79,666 (-8.3)	-0.24 (-3.0)

Source: Kwon 2002.

Table 6. Impact of Payment Reform in Hainan, China: Average Difference-in-Difference Estimates

	Reform Hospitals			FFS Hospitals				Diff-in-Diff as %
	Before	After	Diff	Before	After	Diff	Diff-in-Diff	of Reform Before
Average Expenditure Per Admission	6428.50 [8264.8]	4740.27 [6254.2]	-1688.23 [304.06] {-5.55}	5138.26 [7927.9]	6927.81 [10233.1]	1789.55 [995.21] {1.80}	-3477.78 [962.74] {-3.61}	-54.10%
Average Program Expenditure Per Admission	4231.49 [5362.5]	3675.71 [4966.1]	-555.78 [204.12] {-2.72}	3732.76 [6727.3]	5346.80 [8052.4]	1614.04 [820.49] {1.97}	-2169.82 [663.12] {-3.27}	-51.28%
Average Patient Co-Payments Per Admissic	1482.85 [3819.2]	1062.81 [1659.3]	-420.04 [133.67] {-3.14}	1268.15 [1498.6]	1429.84 [2530.9]	161.69 [213.25] {0.76}	-581.73 [406.15] {-1.43}	-39.23%
Average Length of Stay Per Admission	28.10 [30.9]	20.95 [19.3]	-7.15 [1.11] {-6.43}	40.13 [50.1]	32.28 [40.6]	-7.85 [5.47] {-1.43}	0.70 [3.74] {0.19}	2.49%

Note: "Before" is 1995/96; "After" is 1997; "Diff" is after minus before; "Diff-in-diff" is diff for reform hospitals minus diff for FFS hospitals. The number of observations is 2983 in 1995/96 and 861 in 1997 for reform hospitals, and 263 in 1995/95 and 106 in 1997 for FFS hospitals. Standard deviations are in straight brackets [ ] and t-statistics are in curly brackets {}.

Source: Yip and Eggleston 2001.

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